IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application

Applicant(s):	Kopmeiners et al.
Case:	4-16
Serial No.:	10/047,064
Filing Date:	January 15, 2002
Group:	2631
Examiner:	Freshteh N. Aghdam

I hereby certify that this paper is being deposited on this date with the U.S. Postal Service as first class mail addressed to the Commissioner for Patents, P.O. 1450, Alexandria, VA 22313-1450

Signature: Date: January 10, 2006

Title: Maximum Likelihood Detection Method Using a Sequence Estimation Receiver

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APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants hereby appeal the final rejection dated August 18, 2005, of claims 1 through 6 of the above-identified patent application.

REAL PARTY IN INTEREST

The present application is assigned to Agere Systems Inc., as evidenced by the statement under 37 CFR 3.73 (b) submitted herewith. The assignee, Agere Systems Inc., is the real party in interest.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

Claims 1-6 are presently pending in the above-identified patent application. Claims 1 and 2 remain rejected under 35 U.S.C. §102(e) as being anticipated by Suzuki et al. (United States Patent Number 6,763,059), claim 4 remains rejected under 35 U.S.C. §103(a) as being unpatentable over Bar-David et al. (United States Patent Number 5,623,511) and further in view of Suzuki et al., and claim 5 remains rejected under 35 U.S.C. §103(a) as being unpatentable over Bar-David et al. and Suzuki et al., and further in view of Dabak et al. (United States Patent Publication Number 2004/0101032). The Examiner indicated that claims 3 and 6 would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

STATUS OF AMENDMENTS

There have been no amendments filed subsequent to the final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

The present invention relates to a detection method using a receiver of a digital communication system for the detection of a symbol from a received signal, which signal is transmitted by a transmitter of the digital communication system, wherein the symbol is a selected symbol out of a predetermined set of symbols and wherein each symbol of the predetermined set comprises a sequence of chips wherein each of the chips is PSK-modulated according to a selected modulation code (page 4, line 7, to page 7, line 4).

STATEMENT OF GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1 and 2 are rejected under 35 U.S.C. §102(e) as being anticipated by Suzuki et al., claim 4 is rejected under 35 U.S.C. §103(a) as being unpatentable over Bar-David et al. and further in view of Suzuki et al., and claim 5 is rejected under 35 U.S.C. §103(a) as being unpatentable over Bar-David et al. and Suzuki et al., and further in view of Dabak et al.

ARGUMENT

Independent Claims 1 and 4

Independent claim 1 was rejected under 35 U.S.C. §102(e) as being anticipated by Suzuki et al., and claim 4 was rejected under 35 U.S.C. §103(a) as being unpatentable over Bar-David et al and further in view of Suzuki et al. Regarding claim 1, the Examiner asserts that Suzuki teaches wherein a set of pilot symbols (i.e. reference symbols) are generated by channel estimating means 231 to 23K. In the final Office Action, the Examiner asserts that Suzuki teaches wherein a set of reference symbols (i.e., FIG. 6, output of means 221) are generated on the basis of the predetermined set of symbols (pilot symbol pattern to be originally transmitted) and the channel estimating means 231 to 23K, wherein each of the successive parts of the received signal, each part having the length of a symbol, are compared with reference symbols through correlating means 241-24K yielding detected symbols i1-ik (FIG. 6, col. 5, lines 51-60).

Regarding claim 1, Appellants note that Suzuki teaches that "channel estimating means 231 to 23K extract ***pilot symbols*** from demodulation symbols, and *compare the extracted* ***pilot symbols*** *with a* ***pilot symbol pattern*** to be originally transmitted *so as* ***to estimate states of channels***." (Col. 5, lines 55-58; emphasis added.) Suzuki discloses a pilot symbol pattern; Suzuki does not disclose or suggest a predetermined *set of symbols*. Independent claim 1 requires *generating a set of* ***reference symbols*** *on the basis of the predetermined set of symbols* and a channel impulse response between the transmitter and the receiver; and *comparing each of the successive parts of the received signal, each part having the length of a symbol, with each of the reference symbols*, yielding a detected symbol for each part of the received signal. In addition, the present invention teaches that "the *detected symbol* is the symbol from the predetermined set of symbols which correspond with the selected reference symbol for the part of the received signal." (Page 5, lines 5-6, of the originally filed specification.) Therefore, Suzuki also does not disclose or suggest *generating a set of reference symbols on the basis of the predetermined set of symbols* and a channel impulse response and does not disclose or suggest *comparing each of the successive parts of the received signal, each part having the length of a symbol, with each of the reference symbols*, yielding a

detected symbol for each part of the received signal.

Regarding claim 4, the Examiner acknowledges that Bar-David is silent about each part of the filter signal being compared to each of the symbols from the predetermined set of symbols yielding a detected symbol for each part of the filter signal, but asserts that Suzuki discloses that the received symbols are compared with predetermined symbols through correlating means 211-21K and 241-24K (FIG. 6; col. 5, lines 51-58).

As noted above, Suzuki does not disclose or suggest a predetermined *set of symbols*. Independent claim 4 requires filtering the received signal with a filter which yields a filter signal, wherein the filter is a matched filter to the channel impulse response between the transmitter and the receiver; and *comparing each of the successive parts of the filter signal, each part having the length of a symbol, with each of the symbols from the predetermined set of symbols* yielding a *detected symbol* for each part of the filter signal.

Thus, Suzuki et al. and Bar-David et al., alone or in any combination, do not disclose or suggest generating a set of reference symbols on the basis of the predetermined set of symbols and a channel impulse response between the transmitter and the receiver; and comparing each of the successive parts of the received signal, each part having the length of a symbol, with each of the reference symbols, yielding a detected symbol for each part of the received signal, as required by independent claim 1, and do not disclose or suggest filtering the received signal with a filter which yields a filter signal, wherein the filter is a matched filter to the channel impulse response between the transmitter and the receiver; and comparing each of the successive parts of the filter signal, each part having the length of a symbol, with each of the symbols from the predetermined set of symbols yielding a detected symbol for each part of the filter signal, as required by independent claim 4.

Claims 2 and 5

Claim 2 is rejected under 35 U.S.C. §102(e) as being anticipated by Suzuki et al. and claim 5 is rejected under 35 U.S.C. §103(a) as being unpatentable over Bar-David et al. and Suzuki et al., and further in view of Dabak et al. Regarding claim 2,

the Examiner asserts that Suzuki teaches wherein the correction signal being subtracted (FIG. 6, means 261) from the received signal prior to symbol detection for suppressing the Inter-Symbol Interference effect (i.e. ISI effect) (FIG. 7; col. 6, lines 6-19; col. 2, lines 15-19). Regarding claim 5, the Examiner acknowledges that Suzuki is silent about the correction signal being subtracted from the part of filter signal, which succeeds the part of the filter signal corresponding to the detected symbol for suppressing the ISI effect, but asserts that Dabak teaches wherein the result of the symbol decision block 818 is subtracted from the output of the matched filter 800.

Appellants note that claim 2 requires wherein the correction signal is subtracted from the part of the received signal which ***succeeds*** *the part of the received signal corresponding to the detected symbol* for suppressing the ISI-effect and that claim 5 requires wherein the correction signal is subtracted from the part of filter signal which ***succeeds*** *the part of the filter signal corresponding to the detected symbol* for suppressing the ISI-effect. Suzuki does not explicitly disclose or suggest that the correction signal is subtracted from the part of the received signal which ***succeeds*** *the part of the received signal corresponding to the detected symbol.*

Thus, Bar-David et al., Suzuki et al., and Dabak et al., alone or in any combination, do not disclose or suggest wherein the correction signal is subtracted from the part of the received signal which succeeds the part of the received signal corresponding to the detected symbol for suppressing the ISI-effect, as required by claim 2, and do not disclose or suggest wherein the correction signal is subtracted from the part of filter signal which succeeds the part of the filter signal corresponding to the detected symbol for suppressing the ISI-effect, as required by claim 5.

Conclusion

The rejections of the cited claims under sections 102 and 103 in view of Bar-David et al., Suzuki et al., and Dabak et al., alone or in any combination, are therefore believed to be improper and should be withdrawn. The Examiner has already indicated that claims 3 and 6 would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

The attention of the Examiner and the Appeal Board to this matter is appreciated.

Respectfully,

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APPENDIX

1. A detection method using a receiver of a digital communication system for the detection of a symbol from a received signal, which signal is transmitted by a transmitter of the digital communication system, wherein the symbol is a selected symbol out of a predetermined set of symbols and wherein each symbol of the predetermined set comprises a sequence of chips wherein each of the chips is PSK-modulated according to a selected modulation code, wherein the method comprises:

generating a set of reference symbols on the basis of the predetermined set of symbols and a channel impulse response between the transmitter and the receiver; and

comparing each of the successive parts of the received signal, each part having the length of a symbol, with each of the reference symbols, yielding a detected symbol for each part of the received signal.

2. The method according to claim 1, further comprising the step of generating a correction signal on the basis of the detected symbol convolved with the channel impulse response, wherein the correction signal is subtracted from the part of the received signal which succeeds the part of the received signal corresponding to the detected symbol for suppressing the ISI-effect.

3. The method according to claim 1, wherein the comparison between each of the parts of the received signal with each of the reference symbols is performed by a correlator yielding a correlation value, wherein the correlation value is corrected with half the energy of the reference symbol.

4. A detection method using a receiver of a digital communication system for the detection of a symbol from a received signal, which signal is transmitted by a transmitter of the digital communication system, wherein the symbol is a selected symbol out of a predetermined set of symbols and wherein each symbol of the predetermined set comprises a sequence of chips wherein each of the chips is PSK-modulated according to

a selected modulation code, wherein the method comprises:

filtering the received signal with a filter which yields a filter signal, wherein the filter is a matched filter to the channel impulse response between the transmitter and the receiver; and

comparing each of the successive parts of the filter signal, each part having the length of a symbol, with each of the symbols from the predetermined set of symbols yielding a detected symbol for each part of the filter signal.

5. The method according to claim 4, further comprising the step of generating

a correction signal on the basis of the detected symbol, wherein the correction signal is subtracted from the part of filter signal which succeeds the part of the filter signal corresponding to the detected symbol for suppressing the ISI-effect.

6. The method according to claim 4, wherein the comparison, between each of the parts of the filter signal with each of the reference symbols, is performed by a correlator yielding a correlation value, wherein the correlation value is corrected with half the energy of the reference symbol.

EVIDENCE APPENDIX

There is no evidence submitted pursuant to § 1.130, 1.131, or 1.132 or entered by the Examiner and relied upon by appellant.

RELATED PROCEEDINGS APPENDIX

There are no known decisions rendered by a court or the Board in any proceeding identified pursuant to paragraph (c)(1)(ii) of 37 CFR 41.37.